

hand, where the column is narrowed to a very great extent, and where the velocity of the gyrations is excessive, the obstacles met with exercising little influence, are instantly reversed or overcome. Waterspouts acting by the lower extremity, at a distance from their funnel-shaped top (*embouchure*), undergo no change; but cyclones will not withstand the forces brought into play so easily.

Let the modifications thus induced by external causes be what they may, the preceding theory shows that they are possible, and that the rigorously circular movement enunciated by the authors of the "Laws of Storms" allows of perturbations more or less local, and more or less marked, for the simple reason that the whirling movements, which in the case of cyclones are reduced to their upper portions and are therefore little more than mere discs, are very easily modified. It is this, moreover, which explains the deviations from the rule that are found in even the earliest writings of the authors of the "Laws of Storms," as, for example, in Fig. 1 (vol. xii. p. 401), representing the Cuba hurricane, where, notwithstanding the general agreement of the arrows showing the wind with the purely circular theory of storms, there also occur several local deviations.

What can these perturbations be? How can a gyrotory movement be changed under the influence of a given external cause? What happens if the velocities of the generating current undergo local changes? It would be as difficult to answer these inquiries *à priori* as it would have been to foresee, before the development of the mechanical theory of solid bodies, the astonishing results of an external force brought to bear on them; but the study of other whirling movements more within the reach of observation, and directed to the sun, has shown that a cyclone is not arbitrarily deformed in any manner whatever. Segmentation, or breaking up of the cyclone, is the last term of the alterations which it can undergo. Then the fragments into which it is broken up tend to assume the form of cyclones, each as perfect as the one from which they were formed, and they follow routes differing but little from each other and describing nearly the same trajectory, but at a distance from each other. This segmentation of cyclones occasionally occurs in the case of the thunderstorms which advance on France from the Bay of Biscay, of which the thunderstorm of the 9th of March, 1865, so well described by M. Marié-Davy, may be cited as an example. A like process of segmentation cannot take effect unless the primitive cyclone in some part and for some time deviate from its rigorously circular form. The tendency to keep this form maintains the ascendancy sometimes, but if it begins to give way in a large cyclone, the result is a breaking up of the cyclone itself into segments.

It would be easy to adduce numerous cases in which whirlwinds, tornadoes, and cyclones appear in groups about a given point, or at least follow each other with rapidity. The evidence all goes to show that they are most frequently the result of the phenomenon of *segmentation*, so called from the term used in natural history to designate the process by which some of the lower animals are divided into segments each of which soon becomes a complete animal of itself. But it is in solar cyclones where this mysterious operation can be best followed step by step. Thus a circular sunspot may be seen gradually undergoing the process of deformation, then breaking up into parts, and ending by giving birth to other spots, which precede the original one in a row and at some distance, proceeding at the same pace and reproducing on a small scale the features and behaviour of the primitive type.

CONCLUSION.

The laws of storms, the statement of which in absolute terms ignores the modifications we have indicated, are therefore in reality only an approximate enunciation, just as are Kepler's laws, to which we have more than once

compared them. Kepler's laws would be rigorously exact if we could leave out of account the action of the planets on each other and on the sun; but this being impossible, these laws are not an adequate expression of the truth. The same holds good with respect to the laws of storms. They would also be exact if the currents of the atmosphere never exerted any disturbing action, and as the laws take no account of these disturbing actions, and do not give the means of foreseeing them, or at least of measuring their effects, it would be a mistake to apply them blindly in practical affairs.

It was not by substituting the *cassinoïde* for Kepler's ellipse that science made progress; in like manner it will not be by the substitution of centripetal diagrams of storms for circular diagrams that navigation will be rendered safer. If we have succeeded in giving the true theoretical interpretation of these laws, it must be granted that the time has not come to abandon them, but rather to make them more complete.

To sum up, there are no centripetal waterspouts, whirlwinds, typhoons, or cyclones. The *moveable* forces of aspiration formed, as is said, over the heated ground of the tropics, do not transport themselves with their accompanying updraught to a distance of 700 or 800 leagues over the cold soil of high latitudes, and they have never determined the whirling movements of our atmosphere. The Laws of Storms are in general accord with the mechanical theory of these movements. The rules of navigation which are deduced from them, merit in ordinary cases the confidence sailors have had in them for the past thirty years. The exceptions should be only regarded as mechanical disturbances of the gyrotory movement, the further study of which seems destined to complete a first and happy approximation to the truth. The discovery of the approximate laws of storms is one of the finest scientific conquests of this century, and if a closer approximation is to be made, it will be by a more careful study of solar cyclones.

Formerly whirling movements played an important part in our general conceptions of the universe. Fallen into disrepute by a very natural reaction from a false idea, they have been too much forgotten; therefore when at a later period a gyrotory character was recognised in the great movements of the atmosphere, an effort was made with one consent to connect them with totally different causes. Geometricians seemed to class them among those irregular movements of which nothing could be made. We see, however, that movements of the cyclonic order constitute in truth a vast series of regular and stable phenomena, of which their perturbations even exhibit a behaviour in accordance with geometric principles. This series which begins with simple eddies in our streams of water, embrace the most singular as well as the most dreaded phenomena of the atmosphere, together with the vast movements which observation reveals in the sun, and extends even to the nebulae, the structure of which Rosse's telescope has proved to be characterised by whirling movements. It is therefore most desirable that the theory of these movements should be again included in the domain of applied mechanics. The first step to this end is an empirical investigation of their laws, and this work the eminent authors of the "Laws of Storms" accomplished thirty years ago.

NOTES

Two members of the British Ornithologists' Union, Messrs. Harvie-Brown and Henry Seebohm, have recently returned from a most successful expedition into Northern Siberia. Leaving this country early in the spring of this year, they arrived at Ust Zylma, on the Petchora River, in the middle of April, after travelling overland from Archangel. They remained there

until the breaking up of the ice in the beginning of June, when they took boat to Alexievskia, and made this their head-quarters for some time. Of the most important ornithological acquisitions amongst more than 1,000 skins, are the young in down together with the eggs of the Little Stint and Grey Plover, the eggs (for the first time) of Bewick's Swan, the eggs of *Sylvia middendorffii* and *S. borealis*, the eggs of *Motacilla citreola*, the eggs of the Smew, and a new species of Pipit. These specimens will be exhibited by Mr. Seeböhm at the next meeting of the Zoological Society on the 16th instant.

THERE are three professorships in Trinity College, Dublin, which, by the School of Physic Act (40 Geo. III., chap. 84), become vacant at the end of every seventh year from the date of election; but it is also provided that every professor should be capable of re-election. The three professorships are those of Anatomy, of Chemistry, and of Botany. Pursuant to notice in the London and Dublin *Gazettes*, we learn that the latter of these will be vacant on the 23rd of January, 1876, and that on Saturday, the 29th of January, 1876, the Provost and Senior Fellows will proceed to the election. All candidates are required to send their names, with the places for their education, the universities where they have taken their degrees, to the Registrar of Trinity College, Dublin, before the 22nd January, 1876, and for further information are to apply to the Rev. Dr. Haughton, F.R.S., Medical Registrar of the School of Physic. The emoluments of the professor consist of 300*l.* a year, for which he is required to deliver, first, a course of lectures on Botany in the Arts School during each of the three college terms. Michaelmas Term commences early in October, and Trinity Term sometimes lingers on until the month of July. Secondly, a course of not less than forty lectures on Botany in the Medical School, commencing on the 1st of April and ending on the 1st of July in each year. As Curator of the College Herbarium, there is an additional salary of 50*l.* per annum. The professor being his own assistant, the whole work of arranging and sorting this well-known collection, as well as the correspondence incidental to such a charge, falls on the Curator. The fees average, we are informed, a sum of about nine guineas a year, as the lectures are free to all students of the University. The present Professor, Dr. E. Perceval Wright, being eligible, is a candidate for reappointment.

HIS Excellency the Lord Lieutenant of Ireland has been pleased to appoint Dr. John James Charles to the chair of Anatomy in the Queen's College, Cork, vacant by the resignation of Dr. Corbett. Dr. Charles was a pupil in the Queen's College, Belfast, and is a graduate with high honours of the Queen's University in Ireland. For some time he was assistant lecturer to Prof. Wyville Thomson, and for many years he was Prof. Redfern's assistant and demonstrator. Well taught himself, and already a contributor of numerous essays to the medical journals, we anticipate for Dr. Charles every success as a teacher. With Redfern and Cleland as his colleagues, anatomy appears to be well represented in the Queen's Colleges in Ireland.

THE Vienna Academy of Sciences, says *La Nature*, is occupied with a question which concerns all Europe—the decrease of the quantity of water in springs, rivers, and watercourses. A circular, accompanied by a very instructive report, has been addressed to the scientific societies of other countries, inviting them to undertake observations which, in time, may yield useful results. The Academy calls attention to the fact that during a certain number of years there has been observed a diminution in the waters of the Danube and other large rivers, especially since the practice of felling forests has become common. The Austrian Engineers' and Architects' Union are also occupied with this question, and have appointed a Hydrostatic Commission

to collect facts and prepare a report. The Danube, the Elbe, and the Rhine have each been assigned to two members, while two others will be occupied with the meteorology relating to the same subject and with the influence that glaciers and Alpine torrents may exercise on the general result. The Commission considers the question urgent, and recommends the immediate adoption of measures to remedy the evil. According to the *Revue des Eaux et Forêts*, it is unanimous in declaring that the prime cause of the disastrous decrease of the water is the devastation of the forests.

WE are informed that Mr. Gould will shortly issue the first and second part of an important work on the "Birds of New Guinea," which will at the same time form a second supplement to the "Birds of Australia," and will contain illustrations and descriptions of several new species not included in the latter work.

AT a congregation held at Cambridge on Oct. 28, it was resolved to establish a Professorship of Mechanism and Applied Mechanics, with a stipend of 300*l.* a year. There are already three candidates, viz.—Mr. James Stuart, M.A., Fellow of Trinity College; Mr. E. J. Routh, M.A., F.R.S., of St. Peter's College; and the Rev. J. C. Williams-Ellis, of Sidney.

THE Board for superintending non-collegiate students at Cambridge give notice that there will be an examination in certain selected branches of physical science for the award of an exhibition granted by the Worshipful Company of Clothworkers, commencing on Thursday, Jan. 13, 1876, 9 A.M. The exhibition will be one of 50*l.* per annum, tenable for three years by a non-collegiate student of the University of Cambridge. Full information may be obtained from the Censor, Rev. R. B. Somerset.

AN interesting paper on "The Influence of the Sunspot Period upon the Price of Corn" formed the subject of a paper by Prof. W. Stanley Jevons, F.R.S., at the recent meeting of the British Association. After alluding to the attempts made by Mr. Carrington to trace a connection between the price of corn and the variations in the sunspots during portions of the last and present centuries, the Professor said that Mr. Schuster has pointed out that the years of good vintage in Western Europe have occurred at intervals approximating to eleven years, the average length of the principal sunspot period. The elaborate collection of the prices of commodities in all parts of England between the years 1259 and 1400, published in Prof. J. E. T. Rogers's "History of Agriculture and Prices in England," appears to afford the best data for deciding whether the sunspot period influences the price of corn. For this purpose, tables of the average prices per quarter of wheat and other grain, expressed in grains of pure silver, were used. Each series of prices was divided into intervals of eleven years, which were ranged under each other and averaged, so as to give the average of the first, of the second, of the third, &c., years, the commencement of the period being arbitrarily assumed. It is found that the price of each kind of produce examined rises in the first four years, but afterwards falls. It is further shown that the *maxima* prices are found to fall into the tenth, eleventh, first, second, and third years of the assumed eleven-year period. These results are to be looked upon as only preliminary, and need further investigation. It is also pointed out that commercial panics have tended to recur during the last fifty-four years in a distinctly periodic manner. The average length of interval between the principal panics is about 10.8 years, nearly coinciding with 11.1, the length of the solar-spot period. If Prof. Balfour Stewart be right in holding that the sunspot variation depends on the configurations of the planets, it would appear that these configurations are the remote cause of the greatest commercial disasters.

THE death is announced, at the age of seventy-eight years, of Sir John Gardner Wilkinson, F.R.S. He was well known for his successful explorations in Egypt, and his archaeological and geographical publications. In 1852 he was created hon. D.C.L. of Oxford, was corresponding member of the R.I.A. of Vienna and of the Royal Academy of Turin.

DR. LORRAIN, one of the most popular professors of the Paris Medical Faculty, died from apoplexy a few days ago. The Minister of Public Instruction and all the professors of the faculty were present at his funeral. Dr. Lorrain wrote many excellent works on professional subjects, amongst which we may notice "Diagnostic by Pulsation."

THE resignation of M. Wurtz has been tendered once more and accepted by the French Minister of Public Instruction, and M. Vulpian has been appointed to succeed him as Dean of the School of Medicine of Paris.

THE Observatory of Toulouse has purchased a telescope of eighty-five centimetres diameter, and five metres focal distance, at a cost of 1,200*l*. M. Tisserand is head of the Toulouse Observatory.

PETERMANN'S *Mittheilungen* for November contains the following papers:—On Soleillet's and Largeau's travels in the Sahara and to Soudan, by Dr. Gerhard Rohlfs. The continuation of Weyprecht's "Pictures from the High North," in which he describes the formation of the pack-ice, and gives some forcible illustrations of ice-pressure. Under the head of "Most Recent Travels in Australia," accounts are given of Forrest's journey through W. Australia (1874), Lewis's explorations in the north and east of Lake Eyre, with a map (1874-5), Ross's journey in the S.W. of South Australia (1874), and Giles's journey from Fowler Bay to Torrens Lake. A paper, with map, by E. Behm, on the extension of the Egyptian power on the Upper Nile, treats of the results obtained by Baker, Long, Kemp, and Marno.

In the *Bulletin* of the French Geographical Society for October is an itinerary of a journey by the energetic Abbé Desgodins in 1873, from Yerkalo to Tse-Kou, both on the river Lan-Tsang-Kang, in Eastern Tibet. It is accompanied by a map of part of Eastern Tibet to the north of Burmah and Yunan, containing the courses of many rivers, and the positions of a large number of towns. There is also a paper, with map, by Colonel Long, describing his journey in 1874-5 to the Victoria Nyanza, and the Niam-Niam country. M. E. Boisse describes a visit which he paid in 1874 to Samoa and a few other Pacific islands.

PROFESSORS Nordenskjöld, Lundström, and Stuxberg, who took leave of the Swedish Arctic Expedition at the mouth of the Yenesei River on the 19th of August last, with the intention of returning to Sweden *via* Siberia, arrived at Ekaterinburg on October 29, and were to remain for four days.

THE report of the meeting of the Eastbourne Natural History Society for October 15 contains a paper by Mr. F. C. S. Roper, F.L.S., on the additions to the Fauna and Flora of Eastbourne during 1875.

THE Eighth Annual Exhibition of the Haggerston Entomological Society will take place at the Society's Rooms, 10, Brownlow Street, Dalston, on Thursday and Friday, Nov. 11 and 12, 1875, between the hours of 6 and 11 P.M.

FROM the "Proceedings of the Liverpool Naturalists' Field Club" for 1874-5, we find that the Society continues to do a creditable amount of useful work. Ten field meetings were held last summer, and from the way in which these are conducted, the members are likely to derive much benefit from them. The "Proceedings" contain an admirable address by the President, the Rev. H. H. Higgins, well calculated to stimulate

those who heard it to an earnest study of science. Mr. Higgins has been presented by the Society with a handsome testimonial in acknowledgment of his long and valuable services as president.

FROM the Tenth Report of the Quekett Microscopical Club we learn that the number of members is 530, and that the Club is, in all respects in a prosperous condition.

ANOTHER part of "Figures of Characteristic British Fossils with Descriptive Remarks" has been issued. It will be recollected that Part I. appeared in 1867, II. in 1869, and III. in 1871. These three parts included from the Cambrian to the Devonian forming thirty plates. This new part (IV.) contains plates 31 to 42, and includes "Devonian, Old Red Sandstone, Carboniferous and Permian," completing the Palæozoic division. In addition to the plates giving figures of fossils and the letter-press description, there are descriptive remarks on groups of fossils with woodcuts of recent and fossil forms for comparison.

WE have just received a copy of the report on deep-sea dredging operations in the Gulf of St. Lawrence, by J. F. Whiteaves, dated Montreal, 1874. The ship used] was the Government schooner *J. H. Nickerson*, of seventy tons. Four cruises were made. In the first 14 casts of the dredge were made in 110 to 220 fathoms, in the second 16 hauls in 20 to 70 fathoms, in the third 18 hauls, and the fourth 16, in neither of which is the depth stated. A summary of the zoological results is given, the determinations being mostly by Professors A. E. Verrill and S. J. Smith.

WE would recommend to the notice of those of our readers who are interested in the antiquities of our country, a third revised edition of Mr. Thomas Wright's well-known work, "The Celt, the Roman, and the Saxon" (Triibner). It contains a vast amount of information on the pre-Christian condition of England.

AMONG the subjects on which the Council of the Institute of Civil Engineers invite communications and offer premiums is "The Flow of Fluids, liquid and gaseous."

FROM the "Report" for 1874 of the Cardiff Naturalists' Society, established in 1867, we learn that it is increasing rapidly in numbers and prosperity. During 1874 the Committee tried the experiment of introducing scientific and other lectures, and although monetarily they were a failure, in other respects they were so satisfactory that the Committee recommended their continuance for another year. A large proportion of lectures on important scientific subjects were given, and two field meetings were held. The "Report" contains a Meteorological Report for each month of the year, by Mr. F. G. Evans, F.M.S., and also a table of rainfall observations in the Society's field.

THE following papers by Mr. T. Mellard Reade, C.E., F.G.S., have been reprinted from the Proceedings of the Liverpool Geological Society:—"The Glacial and Post-glacial Deposits of Garston and the surrounding District, with Remarks on the Structure of the Boulder Clay;" and "Speculations on the probable Distribution of Land and Sea during the Deposition of the Marine Boulder Clays and Sands."

WE have received an address by Prof. R. H. Thurston, C.E., delivered to the graduating class of the Stevens Institute of Technology (U.S.) It is entitled "The Mechanical Engineer, his Preparation and his Work," and contains some excellent advice, useful not only to young engineers, but to all who have been trained to other mechanical professions. The Stevens Institute, though what we would call a technical college, affords a good general scientific training, with a fair admixture of literary culture, and the object of Prof. Thurston's address is to show that the more complete is the culture of an engineer, the greater is likely to be his professional success.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus erythraeus*) from India, presented by Mr. R. Roberts; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mrs. Gibbs; two Lesser White-throats (*Sylvia sylvia*), two Yellow Wagtails (*Motacilla flava*), European, presented by Mr. Augustus E. Field; two Central American Agoutis (*Dasyprocta punctata*) from Central America, presented by Mr. W. G. Davis; a Polar Bear (*Ursus maritimus*), Arctic Regions; a Smooth-headed Capuchin (*Cebus monachus*) from S.E. Brazil; a White-throated Capuchin (*Cebus hypoleucus*) from Central America; a Golden Eagle (*Aquila chrysaetus*) from Hudson's Bay; two Maximilian's Aracaris (*Pteroglossus wiedi*) from Brazil, deposited; two Golden Agoutis (*Dasyprocta aguti*), born in the Gardens.

ELEVENTH REPORT OF THE COMMITTEE FOR EXPLORING KENT'S CAVERN, DEVONSHIRE*

THE Committee have again the melancholy duty of reporting that death has deprived them of one of their members. As long ago as 1859, as soon as he became aware of the importance of the discoveries made in the Windmill Hill Cavern at Brixham, Sir Charles Lyell expressed a strong desire that Kent's Cavern should also be systematically and thoroughly explored; and it was with his full concurrence that the proposal to do so was laid before the Committee of the Geological Section of the British Association at Bath in 1864, the day after he delivered his Presidential Address, whilst his ardent advocacy, together with that of the late Prof. Phillips, secured its ready acceptance by the Committee of Recommendations and the General Committee. At the first meeting of the Cavern Committee, appointed in the year just mentioned, he was unanimously elected chairman, and he continued to occupy that post until his lamented decease on Feb. 27, 1875. Though the state of his health prevented him from taking any active part in the exploration, his interest in the work never abated; he always carefully studied the Monthly Reports of Progress sent him by the superintendents, and he made careful arrangements for their preservation.

The Tenth Report, read to the Geological Section of the Association at the Belfast meeting, and printed in the Annual volume for last year, brought up the work to the end of July 1874. The exploration has been carried on without interruption from that date to the present time; the mode of excavation adopted at the beginning has been uniformly followed; the superintendents have visited the cavern daily; the progress of the work has been carefully recorded in the cavern diary; the workmen have, as heretofore, given complete satisfaction; and Monthly Reports have been regularly sent to Sir Charles Lyell until his decease, and subsequently to Mr. John Evans.

The cavern continues to be much visited by persons desirous of studying on the spot its characters and phenomena; and during the last twelve months the superintendents have had the pleasure of taking a large number of visitors through those branches which have been explored, and of explaining to them the mode of operation. Probably a still larger number have been conducted by the "guide," who, though under the control of the committee, is not permitted to take parties to those branches of the cavern in which the exploration is in progress, or has not been begun.

As in former years, rats have frequently been seen running about in various parts of the cavern, including those in which the men have been at work, though hundreds of feet from any glimmering of daylight; and they have displayed their usual boldness as well as their skill in carrying off candles. In other branches, almost as far from the entrances, where all researches have ceased for some years, their footprints are to be seen in great numbers, especially on the silt left, here and there, where the drip is copious in wet weather.

On Jan. 29, 1875, a "buzzing fly" was seen and heard about 300 feet from daylight.

Clinnick's Gallery.—The Tenth Report (1874) stated that the exploration of Clinnick's Gallery was in progress, and had been completed for about 34 feet; that below the least ancient, or the Granular, Stalagmitic Floor, for a distance of 18 feet from its entrance, a small quantity of "cave earth" uniformly presented

itself, beneath which lay the Breccia, occasionally separated from it by remnants of the more ancient, or Crystalline, Stalagmitic Floor *in situ*; but that from the point just named, up to that reached when the Tenth Report was drawn, there was no cave earth, so that the two Stalagmites lay the one immediately on the other, with the Breccia, that is, so far as is known, the oldest of the cavern deposits, beneath the whole.

At the commencement of the exploration of this gallery, the deposits so very nearly reached the roof as to induce the belief that a very few feet at most was all that the workmen had before them. As the work advanced, however, the unoccupied interspace between the roof and floor became gradually larger, until on Aug. 6, 1875, John Clinnick, one of the workmen, forced himself through, and, after proceeding about 50 feet by estimation, entered a large chamber, into which he was followed by one of the superintendents. The chamber, probably one of the largest in the cavern, is beautifully hung with Stalactites, and has numerous Stalagmitic "paps," some of them four feet high, and of almost cylindrical form, rising from a floor of the same material.

Clinnick's Gallery, on being excavated, was found to be a somewhat tortuous passage, varying from four to eight feet in width, and from seven to ten feet in height. That it was once a water-course there can be little doubt, as the roof bears the marks of the long-continued action of a running stream. The walls vary considerably, being in some places smooth, in others much fretted or corroded, and in others more or less angular.

The objects of interest found in this branch of the cavern during the last twelve months have been by no means numerous; nevertheless, they are not without considerable interest.

Attached to the upper surface of the Granular Stalagmitic Floor portions of three land-shells were found, and about twenty bones of mammals were met with lying together loose on the floor. Their characters imply a recent introduction into the cavern.

Incorporated in the Granular Stalagmitic Floor itself were a few bones, including a humerus, a tibia, and an ulna, each nearly entire, and a portion of a large humerus, all of which had been gnawed.

Though no cave earth was met with beyond the point already specified, there seems no doubt that to the era of that deposit may be referred a considerable portion of a radius and of an ulna, both gnawed and found under loose pieces of stalagmite.

The remains found in the Breccia were four teeth of bear, a few bones and fragments of bone, and three teeth of lion in three portions of, no doubt, one and the same lower jaw. The latter "find" (No. 6,482) is of considerable interest, as being the first known instance of remains of any animal besides bear met with in the Breccia. Though the superintendents had no doubt of the feline character of the teeth, they forwarded one of them to Mr. G. Busk, F.R.S., a member of the committee, remarking that they believed it to be the last lower left molar of *Felis spelæa*, and requesting his opinion on it. In his reply, he remarks: "There is no doubt that the tooth is the left lower carnassial of *Felis leo*, but it is of very unusual size, being, I should estimate, one-twelfth bigger than the average dimensions of that tooth in the lion. It is usually longer, but not so thick, in the tiger than in the lion, but the thickness of the present one is proportionate to its length. Another peculiarity, as it seems to me, is the great wear that the tooth has undergone. I fancy existing lions are not allowed to live long enough to wear their teeth so much. At any rate the Kent's Hole tooth appears to be more worn than any other I have as yet met with. Can it belong to *Machairodus*?" Having succeeded in removing some part of the matrix encrusting the other portions of the jaw, they were also forwarded to Mr. Busk, with the observation that the superintendents had carefully considered the question before submitting the first tooth, and had come to the conclusion that the jaw was not that of *Machairodus*, for, waiving the fact that none of the teeth were serrated, the fang of the canine still remaining in the jaw was much too large for a lower canine of any known species of *Machairodus*; and it was suggested that it might be worth considering whether the specimen belonged to any of the species of *Felis* found in the forest-bed of Cromer. To this Mr. Busk replied: "The jaw does not appear to present anything unusual. It is, however, a good example to show that the cave lion lived to a good old age."

The Breccia in Clinnick's Gallery also yielded seven specimens of flint and chert, none of which need detailed description.

The comparative paucity of specimens induced the superintendents to suspend operations in that direction for at least a time. The labour of seven months had been expended on it,

* Abstract read at the Bristol meeting of the British Association.